

REMARKS

The Office Action mailed on March 14, 2008 has been received and carefully considered. Claims 1-22 are pending in the application.

The amendment to paragraphs on page 3, line 22 to page 4, line 29 filed on 12/12/2007 is objected to as introducing new matter.

The objection respectfully is traversed. The objection has been fully considered, and the applicants respectfully disagree that the amendment introduces new matter.

Figs. 1A and 1B, as admitted prior art, are diagrams that illustrate the receiver and transmitter I/Q imbalances, respectively. The receiver I/Q imbalance matrix and the transmitter I/Q imbalance matrix in Figs. 1A and 1B describe quantitatively how the received signal is distorted by the receiver and transmitter I/Q imbalances, respectively. The figures and the matrices can be found in various textbooks on telecommunications, e.g. on page 134-135 in *RF Microelectronics* (Behzad Razavi, Prentice Hall, 1997). Please see attached copy of these pages.

Since the figures and the matrices appear in textbooks and are so well known to those skilled in the art, instead of describing them in detail, the two paragraphs on page 3, line 22 to page 4, line 29 simply mention the I/Q imbalance parameters appearing in the figures and matrices (in the first sentence of each paragraph only), and proceed to describe how, in various embodiments of the present invention, to estimate the receiver I/Q imbalance using a single modulation path, and to estimate the transmitter I/Q imbalance using a single demodulation path. Estimating I/Q imbalance using a single modulation/demodulation path is not a standard textbook technique, but a critical part of the present invention.

The amendment filed on 12/12/2007 only clarifies that the paragraphs on page 3, line 22 to page 4, line 29 describe the present invention, instead of the prior art. Hence, the amendment to these paragraphs does not introduce new matter.

Information Request under MPEP 704.11a

The Examiner also makes an Information Request under MPEP 704.11a for a copy of the "original prior art reference describing figures 1A and 1B." In reply, the applicants again note that the prior art of Figs. 1A and 1B can be found in several textbooks on telecommunications, and provide *RF Microelectronics* (Behzad Razavi, Prentice Hall, 1997) as a possible source of the figures. However, the applicants do not recall precisely what, if any particular publication was a source of Figs. 1A and 1B. The applicants have also googled through Google Scholar with the keyword "IQ imbalance", and have found 58 related references dated before the year of 2002. An exemplar reference is the "Effects of Tuner IQ Imbalance on Multicarrier-Modulation Systems" by Martin Buchholz et al., which is cited and a copy supplied in an attached IDS. Please see attached copy of this reference.

The Examiner suggests that perhaps the Japanese patent *JP 09-153882* is the prior art reference upon which prior art Figs. 1A and 1B are based. The applicants would deny that it is. Rather, according to the applicants, prior to filing the present application, they had never reviewed Japanese patent *JP 09-153882*, and this reference was cited by the applicants to the USPTO in an IDS only because it was a reference cited by the Japanese Patent Office regarding a corresponding Japanese application.

Although *JP 09-153882* has not been cited against the present claims, and it therefore could be asserted that the issue is not ripe for consideration, so that the applicants are under no obligation to distinguish the invention from that reference, applicants nonetheless would point out important distinctions so as perhaps to advance the prosecution beyond such reference in case the Examiner would cite it in a subsequent action. In the present invention as recited in claim 1, the receiver receives two signals that are transmitted through a single modulation path, rather than through two modulation paths as in *JP 09-153882*. In the present invention as recited in claim 8, the receiver receives two signals and demodulates them through a single demodulation path, rather than through two demodulation paths as in *JP 09-153882*. The apparatus claims, claims 12 and 16, would share a similar argument, which is therefore omitted here. Hence, *JP 09-153882* does not teach the critical features of the present invention, and thus should not be cited against the present invention.

Claims 1-22 are finally rejected under 35 U.S.C 103(a) as being unpatentable over Prior Art Fig. 1B in view of Tanaka (U.S. Patent 6,498,822).

The rejection respectfully is traversed. The present invention as recited in claim 1 is directed to a method for estimating an I/Q imbalance parameter of a receiver using a single modulation path of the transmitter, and claim 8 recites a method for estimating an I/Q imbalance parameter of a transmitter using a single demodulation path of the receiver. Neither the admitted prior art (Figs. 1A and 1B) nor *Tanaka*, nor a combination of the admitted prior art and *Tanaka*, teaches estimating an I/Q imbalance parameter using a single modulation/demodulation path. As noted above, the two paragraphs on page 3, line 22 to page 4, line 29 simply mention the I/Q imbalance parameters appearing in the figures and matrices (in the first sentence of each paragraph only), and proceed to describe how, in various embodiments of the present invention, to estimate the receiver I/Q imbalance using a single modulation path, and to estimate the transmitter I/Q imbalance using a single demodulation path. Estimating I/Q imbalance using a single modulation/demodulation path is not a standard textbook technique, but a critical part of the present invention.

Hence, claims 1 and 8 are not rendered unpatentable by the prior art, even in view of *Tanaka*. Similarly, claims 12 and 16 recite apparatuses utilizing the method of claim 1 and the method of claim 8, respectively. Thus, claims 12 and 16 also are not rendered unpatentable by the prior art.

Claims 2-7 are dependent on claim 1, claims 9-11 are dependent on claim 8, claims 13-15 are dependent on claim 12, and claims 17-22 are dependent on claim 16. Therefore, claims 2-7, 9-11, 13-15 and 17-22 also are deemed clearly to be patentable over the prior art both for their dependency from claims 1, 8, 12 and 16, respectively, and for the limitations they recite.

Based on the above, it therefore is submitted that this application is in condition for allowance and such a Notice, with allowed claims 1-22, earnestly is solicited.

Should the Examiner consider that a conference would help to expedite the prosecution of this Application, the Examiner is invited to contact the undersigned to arrange for such an interview.

No fee is believed due. Should any fee be required, however, the Commissioner is hereby authorized to charge the fee to our Deposit Account No. 18-0002, and advise us accordingly.

Respectfully submitted,



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Date

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